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# Centre for the Fourth Industrial Revolution

World Economic Forum





# World Economic Forum: Committed to improving the state of the world

The World Economic Forum is the international organization for public-private cooperation. The Forum engages the foremost political, business and other leaders of society to shape global, regional and industry agendas.

The Fourth Industrial Revolution – the current period of rapid, simultaneous and systemic transformations driven by advances in science and technology – is reshaping industries, blurring geographical boundaries, challenging existing regulatory frameworks, and even redefining what it means to be human.

The Forum's Centre for the Fourth Industrial Revolution is a newly established focal point within the international community for multistakeholder dialogue and concrete cooperation on governance challenges and opportunities presented by advanced technologies.

Drawing on the Forum's global platform for interaction, insight and impact, the Centre serves as a public-private platform for the collaborative development and refinement of frameworks and protocols that more fully anticipate the risks and accelerate the social benefits of technology. It is pioneering an agile and human-centred model of technology policy development and implementation through its leadership communities of committed government, industry, academic and civil society decision makers and experts in each technology domain.

# A global hub for public-private collaboration and impact

Emerging technologies are advancing at an unprecedented speed, changing the world as they blur the boundaries among the economic, social and political spheres. Artificial intelligence, blockchain and precision medicine are just a handful of the technologies of the Fourth Industrial Revolution, which are putting enormous pressure on regulatory frameworks.

The Centre for the Fourth Industrial Revolution's **vision** is to help shape the development and application of these emerging technologies for the benefit of humanity.

Our **mission** is to facilitate the co-design, testing and refinement of governance protocols and policy frameworks to maximize the social benefits and minimize the risks of advanced science and technology.

To **achieve impact and drive change**, the Centre brings together governments, business organizations, dynamic start-ups, civil society, academia and international organizations to identify game-changing impacts of emerging technologies, co-design innovative governance protocols and policy frameworks, and pilot and scale them with our partners around the world.

The Centre is located in San Francisco in close proximity to the world's foremost technology companies, start-ups, investors and leading academic institutions.





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# Co-designing policy frameworks and governance protocols: Our projects

At the Centre for the Fourth Industrial Revolution, our projects cover the following areas of technological innovation:

## 1. Artificial intelligence and machine learning

Artificial intelligence (AI) is the software engine that drives the Fourth Industrial Revolution. Its impact can already be seen in homes, businesses and political processes. In its embodied form of robots, it will soon be driving cars, stocking warehouses and caring for the young and elderly. It holds the promise of solving some of the most pressing issues facing society, but also presents challenges such as inscrutable “black box” algorithms, unethical use of data and potential job displacement. As rapid advances in machine learning increase the scope and scale of AI’s deployment, multistakeholder collaboration is required to optimize accountability, transparency, privacy and impartiality to create trust. Project areas include: decision-making tools for corporate boards, protocols for government use of AI, standards for AI targeted at children, and AI ethics curricula for universities.

## 2. Internet of things and connected devices

There are more connected devices in the world today than humans. By 2020, the number of these devices is projected to exceed 20 billion, fuelled by continued technological advances and the plummeting costs of computing, storage and connectivity. As the internet of things continues to spread to across all aspects of day-to-day life, and even become embedded in the human

body, new policy frameworks and governance protocols are needed to address questions of security, data ownership, accuracy, and privacy. Project areas include: improving the security of industrial IoT devices and systems, developing IoT implementation models, educating consumers on privacy and security, increasing data sharing within and between the public and private sectors, and advancing an inclusive 5G roll-out across countries.

## 3. Blockchain and distributed ledger technology

Blockchain, a relatively nascent technology that enables the decentralized and secure storage and transfer of information, has already proven itself to be a powerful tracking and transaction tool. It can minimize friction, reduce corruption, increase trust and empower users. Revolutionary use cases are being explored in almost every sector, ranging from finance to energy to shipping and media. The challenge is to unlock blockchain’s potential in a way that ensures inclusion, safety, interoperability and scale. This project will work to advance the principles of good governance to support the infrastructure underlying, and the applications built on, distributed ledger technology. Project areas include: digital identity, supply chain integration, data ownership, and currency and monetary systems.

#### **4. Autonomous and urban mobility**

As the world continues to urbanize, public- and private-sector leaders are developing new mobility solutions. In particular, autonomous vehicles have the potential to improve road safety, decrease pollution levels, reduce congestion and transform the design of our cities. However, transitioning to autonomous vehicles involves a disruptive shift that is bound to reshape public and private transportation systems, leaving many players behind if they fail to keep pace with emerging technologies. Collaboration among business and government leaders is needed to jointly identify the best strategies for accelerating the adoption of autonomous mobility in a safe, clean and inclusive manner. This project provides a platform for city and business leaders to work together to understand and pilot autonomous and shared vehicle fleets – generating key insights, policy frameworks and governance protocols that can be scaled up globally to transform urban mobility. Project areas include: partnering with cities to advance their autonomous and urban mobility strategies, developing city-wide mobility and data management platforms, launching the New Mobility Coalition and building a knowledge-sharing platform for city transportation officials and business executives.

#### **5. Drones and tomorrow's airspace**

Unmanned aircraft systems, commonly known as drones, are democratizing the sky. Each day, participants in the drone ecosystem are discovering new uses for this transformative technology – from delivering packages and lifesaving medicines to airborne taxis and photographing the world. Scaling up our use of airspace to enable millions of craft to fly safely will require smart government regulation and industry-driven standards for airspace management, physical infrastructure and privacy and data ownership policies. Project areas include: new paradigms for drone regulation, a community of future-oriented drone regulators, policies for drone-derived data, drone delivery services, and personal autonomous flight.

#### **6. Precision medicine**

Precision medicine offers the opportunity to harness emerging technologies to tailor diagnosis and treatment of disease to a specific person or population, improving outcomes and potentially lowering costs. This project aims to support the building and testing of policy frameworks to realize the benefits of precision medicine while reducing its risks. Project areas include: generating evidence of precision medicine's effectiveness; data-sharing and related infrastructure; integrating a precision medicine approach into clinical practice; new approaches to regulation, pricing and reimbursement for diagnostics and treatment; and patient and public engagement.

#### **7. Digital trade**

The Fourth Industrial Revolution, driven by rapid technological change and digitalization, has already had a profound impact on global trade, growth and social progress. Cross-border e-commerce generated trillions of dollars in economic activity in 2016 and continues to accelerate. The ability of data to move across borders underpins new business models and has boosted global GDP by 10% in the last decade alone. This has enabled the use of blockchain technology for good, such as by increasing efficiency and transparency in international trade. However, trade policy must evolve to empower new forms of digital commerce and cross-border data flows, addressing such challenges as outdated regulations, fragmented governance and strict data localization policies. Project areas include: new policies for facilitating e-commerce, leveraging emerging technologies such as AI and blockchain to transform international trade, and building global norms for data flows.

## 8. Fourth Industrial Revolution for the Earth

Society's well-being is closely intertwined with the environment. Natural resources fuel the growth of industries and economies, and the environment influences public issues as diverse as health, natural disaster response and recovery, and food and energy security. Increasingly urgent global environmental challenges – such as climate change, loss of biodiversity and ocean health – also need fresh solutions. This project aims to support the building and testing of governance frameworks to realize the benefits of technology for the environment and society, while minimizing harm. Project areas include: blockchain for scaling renewable energy, environmental data for emergency response, and innovative solutions for ensuring the sustainability of our oceans.

## 9. Data Policy

Data is the oxygen that fuels the fire of the Fourth Industrial Revolution. More data is being generated than ever before, with the global volume of data predicted to double between 2018 and 2022, and then double again between 2022 and 2025. The ever-growing deluge of data is driven by the rapidly expanding universe of connected devices via the internet of things (IoT) and by breakthroughs in autonomous vehicles, drone technology and the growing availability of genomic testing. That very data, in turn, is leveraged through machine learning to make AI possible and to power advances in precision medicine, diagnostics and predictive analytics used across industries.

Although an unprecedented amount of data flows across borders and devices, the regulatory environment for data protection remains fractured. As data is increasingly generated and collected globally, businesses require clearer and more practical data policies, while policy-makers need better tools to develop future-oriented and agile frameworks for data regulation that will allow for innovation, but protect individual privacy.

The Data Policy project focuses on maximizing the humanitarian and beneficial uses of data while seeking to develop practical solutions using a multistakeholder approach to policy-making. Project areas include: a data policy toolkit, GDPR compliance mechanisms for Fourth Industrial Revolution technologies, and building a community of data analysts and strategists.

### Project teams

The challenges and opportunities of the Fourth Industrial Revolution are global in scope, have cross-industry impact and require multistakeholder cooperation.

Project teams consist of six to eight people, including two Forum subject-matter experts working alongside fellows from government, business, civil society and academic institutions. Each project team will build policy frameworks and governance protocols with a focus on partners who will pilot them in their jurisdictions and organizations.

Projects will use the Forum's global platform to scale internationally to ensure we shape the future of these technologies for the next generation.

# Global Fourth Industrial Revolution Councils

The World Economic Forum Centre for the Fourth Industrial Revolution is convening the foremost international communities of governmental, corporate, civil society and technical leaders committed to shaping the governance and application of the most important Fourth Industrial Revolution technologies in the global public interest.

Global Fourth Industrial Revolution Councils will:

- **Identify governance gaps** in public policy or private practice that would benefit from multistakeholder development of policy frameworks or governance protocols.
- Create a structured yet informal process among leading policymakers, practitioners and experts for the sharing of information, experience and learnings from **innovative policy and governance experiments** around the world, shaping the trajectory of emerging technologies.
- Provide **strategic guidance** to the Centre's projects and feedback on the specific policy frameworks and governance protocols it produces.

- Serve as **early adopters and ambassadors** to test, refine and improve the interoperability of Fourth Industrial Revolution policies and protocols.

## Our Councils:

- Global Artificial Intelligence Council
- Global Internet of Things Council
- Global Blockchain Council
- Global Autonomous and Urban Mobility Council
- Global Drones and Aerial Mobility Council
- Global Precision Medicine Council

**Participation is by invitation only.** Please email [C4IR@weforum.org](mailto:C4IR@weforum.org) for more information.



# The principles driving the Centre's operations

The Centre is part of the World Economic Forum and will be run according to eight operating principles that form the basis of the Forum model:



**Thought leadership:** The Forum is an established thought leader on the Fourth Industrial Revolution.



**Independent and impartial:** An independent and impartial global platform for dialogue and engagement.



**Multistakeholder approach:** Agile technology frameworks require engagement on the part of government, businesses, experts and academics, international organizations, youth, civil society, and technological innovators.



**Technology company engagement:** Active participation of large technology companies and start-ups is essential. Existing Partners of the Forum include most of the world's leading technology companies and a large community of Technology Pioneers.



**Global context:** Agile technology frameworks must be placed in a wider context. The Forum's global perspective is reflected in its communities, initiatives and meetings.



**Future orientation:** The Forum engages with the world's leading universities and a network of experts from around the world to define and shape a better future.



**Systemic thinking:** All Centre projects will be integrated within the Forum's System Initiatives, which are designed to stimulate effective public-private responses to complex challenges affecting multiple industries.



**Ecosystem approach:** All activities must be integrated into a holistic economic, social and policy-making context.

These principles allow the Centre to implement a uniquely horizontal approach. Projects will examine and advance the transformative impact of technology across all industries and national borders, rather than within traditional verticals or along geopolitical boundaries.



# How do I engage?

## Your role in shaping a better world

**Participation in the Centre's projects is reserved for those with an interest in shaping Fourth Industrial Revolution norms and principles.**

### **Our Partners**

Centre Partners are global companies with the scale and ambition to help chart Fourth Industrial Revolution governance. They play a core leadership role in co-designing and piloting Centre projects.

### **Our Members**

Centre Members are the world's most innovative start-ups and small- and medium-sized enterprises. They are actively engaged in Forum efforts to advance global collaboration on the Fourth Industrial Revolution to benefit society.

### **Government partners**

Working with governments to test and scale these projects is key to achieving impact. The Centre is partnering with approximately 20 governments at the local, regional, sub-national and national level from each region of the world. Partnering governments will be invited to send fellows to the Centre for the duration of a project, generally 12 to 18 months. These fellows will actively develop new governance frameworks with project teams and act as a bridge to their governments to support the testing of new frameworks through pilots.

By joining the Centre for the Fourth Industrial Revolution, companies and governments can:

- Co-design policy and governance protocols that accelerate the societal benefits of Fourth Industrial Revolution technologies and mitigate negative consequences
- Increase understanding of new technologies and technology applications and implement them faster through pilots
- Increase their visibility as global leaders committed to using new technologies to benefit society
- Understand how human-centred design can be used to maximize the positive impact of innovative technologies
- Connect with cutting-edge technology innovators

Engagement allows for attendance at the Annual Meeting of the New Champions, the Forum meeting devoted to science, technology and innovation, held annually in China. In addition, it gives access to the Forum's online platforms, TopLink and Transformation Maps. Partnering organizations will also be able to participate in meetings and workshops at the Centre.

To learn more about business and government engagement opportunities, please contact [C4IR@weforum.org](mailto:C4IR@weforum.org).

Follow news and updates about the Centre on our website at <http://wef.ch/sf> and like our Fourth Industrial Revolution Facebook page at <http://wef.ch/4irfb>.



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